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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/749,763	12/28/2000	Yoshitaka Egawa	201371US2S	4871

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EXAMINER	
HERNANDEZ, NELSON D	

ART UNIT	PAPER NUMBER
2612	

DATE MAILED: 08/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/749,763	EGAWA ET AL.	
	Examiner	Art Unit	
	Nelson D. Hernandez	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 December 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 10* is/are rejected.

7)☒ Claim(s) *9* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 December 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

2. Claims 3 and 6 are objected to because of the following informalities:

Claim 3 recites the limitation "said dynamic range" in line 25. There is insufficient antecedent basis for this limitation in the claim. For examining purposes the limitation "said dynamic range " will be read as “a dynamic range”. Appropriate correction is required.

Claim 6 recites the limitation "said electronic shutter" in line 20. There is insufficient antecedent basis for this limitation in the claim. For examining purposes the limitation "said electronic shutter" will be read as “a electronic shutter”. Appropriate correction is required.

Claim 6 recites the limitation "said dynamic range" in line 21. There is insufficient antecedent basis for this limitation in the claim. For examining purposes the limitation "said dynamic range " will be read as “a dynamic range”. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Egawa, JP 2000-224492 A in view of Merrill, US Patent 5,892,541.

Regarding claim 1, Egawa discloses a solid state imaging device (Figs. 2 and 4) comprising: an imaging region (Fig. 2: 14) including unit cells arranged in a matrix of rows and columns to provide a plurality of pixel rows, each of said unit cells having photoelectric conversion means (Fig. 4: PD) for photoelectrically converting incident light, applied to pixels, to store signal charges, readout means (Figs. 4: 4 and 4: Td) for reading out stored signal charges to a detection node, and amplifying means (Fig. 4: Tb) for amplifying the readout signal, also teaches an internal control (Fig. 4: 10a) for generating various kinds of timing signals for controlling the registers (Fig. 4: 2) (Translation, page 6, lines 3-20; page 7, lines 6-15; page 9, lines 1-3 and 23-42; page 10, lines 24-40; page 12, line 12 – page 13, line 24; page 17, line 34 – page 18, line 19). Egawa does not explicitly disclose a readout voltage switching circuit for setting a readout driving signal, applied to the readout means, to one of a plurality of voltages different to one another according to internal control.

However, Merrill teaches a solid state imaging apparatus carrying a plurality of active pixel sensors (Fig. 2: 110) having a photo detector (Fig. 3: 122) converting incident light into electrical signal charge and an amplifier reading the electrical signal charge converted by said photodetector, for every pixel, and outputting voltage converted by said amplifier to common signal line (Col. 5, lines 19-35), comprising voltage detection means (Fig. 2: Detection Circuit DC) for detecting that voltage

outputted to said signal line changes more abruptly than usual case after said active pixel sensor is reset (Col. 5, line 36 – col. 6, line 55; col. 7, lines 13-67; col. 8, lines 34-43); and reset voltage setting means for using predetermined voltage as a voltage at the time of reset when said voltage detection means detects unusual voltage (Col. 3, lines 36-67; col. 5, lines 36-63; col. 7, line 52 – col. 8, line 12; col. 8, lines 33-67; col. 11, lines 6-26).

Therefore, taking the combined teaching of Egawa in view of Merrill as a whole, it would have been obvious to one of ordinary skilled in the art at the time of the invention to modify Egawa by incorporating a voltage detection means for detecting that voltage outputted to said signal line changes more abruptly than usual case after said active pixel sensor is reset; and reset voltage setting means for using predetermined voltage as a voltage at the time of reset when said voltage detection means detects unusual voltage. The motivation to do so would help to increase the dynamic range of the imaging system as suggested by Merrill (Col. 4, lines 42-47; col. 10, lines 6-10).

Regarding claim 2, the combination of Egawa in view of Merrill teaches that the readout voltage switching circuit sets a voltage of said readout driving signal, corresponding to a readout pulse for dynamic range increase, to a lower voltage (Merrill, Col. 6, lines 44-49) than a voltage of said readout driving signal corresponding to a usual readout pulse. Grounds for rejecting claim 1 apply here.

Regarding claim 3, the combination of Egawa in view of Merrill teaches that the readout voltage switching circuit sets a voltage of said readout driving signal, corresponding to said readout pulse for a dynamic range increase, to a lower voltage

(Merrill, Col. 6, lines 44-49) than a voltage of said readout driving signal corresponding to a pulse for an electronic shutter and said voltage of said readout driving signal corresponding to said usual readout pulse. Grounds for rejecting claim 1 apply here.

Regarding claim 4, Egawa discloses a solid state imaging device (Figs. 2 and 4) comprising: an imaging region (Fig. 2: 14) including unit cells arranged in a matrix of rows and columns to provide a plurality of pixel rows, each of said unit cells having photoelectric conversion means (Fig. 4: PD) for photoelectrically converting incident light, applied to pixels, to store signal charges, readout means (Figs. 4: 4 and 4: Td) for reading out stored signal charges to a detection node, and amplifying means (Fig. 4: Tb) for amplifying the readout signal; a plurality of readout lines (Fig. 4: HLIN) provided in a horizontal direction in corresponding to each pixel row in said imaging region, said plurality of readout lines transmitting a readout driving signal for driving each readout means of said unit cells in a corresponding pixel row respectively; a pulse production circuit (Fig. 4: 24) for producing a plurality of pulses for respective pixel rows as pulse signals for controlling readout timing in said plurality of pixel rows; a plurality of vertical signal lines (Fig. 4: 4 and VLIN), provided in correspondence to respective pixel columns in said imaging region, for transmitting a signal provided from said unit cells of said each pixel row in a vertical direction (Translation, page 6, lines 3-20; page 7, lines 6-15; page 9, lines 1-3 and 23-42; page 10, lines 24-40; page 12, line 12 – page 13, line 24; page 17, line 34 – page 18, line 19). Egawa does not explicitly disclose a readout voltage switching circuit for setting a voltage of said readout driving signal, applied to said readout means in correspondence to a part of pulse in said plurality of pulses, to a

voltage differ from said voltage of said readout driving signals, applied to said readout means in correspondence to the other pulse in said plurality of pulses.

However, Merrill teaches a solid state imaging apparatus carrying a plurality of active pixel sensors (Fig. 2: 110) having a photo detector (Fig. 3: 122) converting incident light into electrical signal charge and an amplifier reading the electrical signal charge converted by said photodetector, for every pixel, and outputting voltage converted by said amplifier to common signal line (Col. 5, lines 19-35), comprising voltage detection means (Fig. 2: Detection Circuit DC) for detecting that voltage outputted to said signal line changes more abruptly than usual case after said active pixel sensor is reset (Col. 5, line 36 – col. 6, line 55; col. 7, lines 13-67; col. 8, lines 34-43); and reset voltage setting means for using predetermined voltage as a voltage at the time of reset when said voltage detection means detects unusual voltage (Col. 3, lines 36-67; col. 5, lines 36-63; col. 7, line 52 – col. 8, line 12; col. 8, lines 33-67; col. 11, lines 6-26).

Therefore, taking the combined teaching of Egawa in view of Merrill as a whole, it would have been obvious to one of ordinary skilled in the art at the time of the invention to modify Egawa by incorporating a voltage detection means for detecting that voltage outputted to said signal line changes more abruptly than usual case after said active pixel sensor is reset; and reset voltage setting means for using predetermined voltage as a voltage at the time of reset when said voltage detection means detects unusual voltage. The motivation to do so would help to increase the dynamic range of the imaging system as suggested by Merrill (Col. 4, lines 42-47; col. 10, lines 6-10).

Regarding claim 5, the combination of Egawa in view of Merrill teaches that the pulse production circuit generates in sequence a readout pulse for a dynamic range increase and a usual readout pulse as said plurality of pulses, and wherein said readout voltage switching circuit sets a voltage of said readout driving signal corresponding to a readout pulse for said dynamic range increase, to a lower voltage (Merrill, Col. 6, lines 44-49) than a voltage of said readout driving signal corresponding to said usual readout pulse. Grounds for rejecting claim 4 apply here.

Regarding claim 6, the combination of Egawa in view of Merrill teaches that the pulse production circuit generates in sequence a readout pulse for said electronic shutter, a readout pulse for said dynamic range increase and a usual readout pulse as said plurality of pulses, and wherein said readout voltage switching circuit sets a voltage of said readout driving signal, corresponding to a readout pulse for said dynamic range increase, to a lower voltage (Merrill, Col. 6, lines 44-49) than a voltage of said readout driving signal corresponding to said readout pulse for said electronic shutter. Grounds for rejecting claim 4 apply here.

Regarding claim 7, Egawa discloses vertical driving means (Fig. 2: 15a) for selectively supplying said readout driving signal to said plurality of readout lines in correspondence to said plurality of pulses supplied from said pulse production circuit, thereby driving said readout means of each pixel row in said imaging region for several times (Translation, page 6, lines 3-20; page 7, lines 6-15; page 9, lines 1-3 and 23-42; page 10, lines 24-40; page 12, line 12 – page 13, line 24; page 17, line 34 – page 18, line 19).

Regarding claim 8, Egawa discloses that the vertical driving means provides a plurality of readout driving signals, corresponding to respective said plurality of pulses, during any horizontal driving periods (Translation, page 6, lines 3-20; page 7, lines 6-15; page 9, lines 1-3 and 23-42; page 10, lines 24-40; page 12, line 12 – page 13, line 24; page 17, line 34 – page 18, line 19).

Regarding claim 10, the combination of Egawa in view of Merrill teaches that the imaging region further includes reset means (Fig. 3: CR and fig. 2: CR1 and CRm) for resetting a detection node for reading signal charges stored at said photoelectric conversion means, and wherein said vertical driving means supplies a reset signal for driving said reset means prior to said read driving signal (Col. 5, lines 4-28 and 36-62; col. 6, lines 13-49). Grounds for rejecting claim 4 apply here.

Allowable Subject Matter

5. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Egawa, US Patent 6,507,365 B1 teaches AD converter (Fig. 28: 218) for converting signals, transmitted to said plurality of vertical signal lines, to digital signals (Col. 30, line 54 – col. 31, line 34; col. 34, line 49 – col. 35, line 3). However, Egawa fails to anticipate or suggest that said AD converter is controlled in such a manner that signal conversion is stopped when said readout driving signal is provided during effective horizontal periods.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nelson D. Hernandez whose telephone number is (703) 305-8717. The examiner can normally be reached on 8:30 A.M. to 6:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy R. Garber can be reached on (703) 305-4929. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Nelson D. Hernandez
Examiner
Art Unit 2612

NDHH
August 20, 2004

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PRIMARY EXAMINER